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GLOSSARY OF ACRONYMS

ABES	Amended Budget Estimate Submission
ACU	Avionics Computer Unit
AD	Active Duty
AEF	Aerospace Expeditionary Force
AEW	Aerospace Expeditionary Wing
AFMSS	Air Force Mission Support System
AFRC	Air Force Reserve Command
AOR	Area of Responsibility
AR	Attrition Reserve
ASIP	Aircraft Structural Integrity Program
BAI	Backup Inventory
BLOS	Beyond-Line-of-Sight
C2	Command and Control
C3	Command, Control and Communications
C3I	Command, Control, Communications, and Information
CALCM	Conventional Air Launched Cruise Missile (AGM-86C)
CAP	Combat Air Patrol
CAS	Close Air Support
CB	Test Coded (OT&E)
CC	Combat Coded
CDU	Control Display Unit
CEM	Combined Effects Munition (CBU-87)
CINC	Commander-in-Chief
CONOPs	Concept of Operations
CONUS	Continental United States
DCA	Defensive Counterair
DEAD	Destruction of Enemy Air Defenses
DEC	Digital Engine Control
DoD	Department of Defense
DT&E	Development Test and Evaluation
DTU	Data Transfer Unit
EA	Electronic Attack
ECM	Electronic Countermeasures
EHF	Extremely High Frequency
EP	Electronic Protection
EI	Test Coded (DT&E)
FOL	Forward Operating Location
FSA	Future Strike Aircraft
FYDP	Future Years Defense Plan
FY	Fiscal Year
GATM	Global Air Traffic Management System
GMTI	Ground Moving Target Indicator

GMTT	Ground Moving Target Tracker
GPS	Global Positioning System
GP	General Purpose
GSS	Gyro Stabilization System
GSTF	Global Strike Task Force
IADS	Integrated Air Defense System
ICAO	International Civil Aviation Organization
IFF	Identification Friend or Foe
INS	Inertial Navigation System
IOC	Initial Operational Capability
JASSM	Joint Air-to-Surface Standoff Missile (AGM-158)
JDAM	Joint Direct Attack Munition (GBU-31)
JMPS	Joint Mission Planning System
JSOW	Joint Standoff Weapon (AGM-154)
LGB	Laser Guided Bomb
LO	Low Observable
LOS	Line-of-Sight
LRSA	Long-Range Strike Aircraft
LRU	Line Replaceable Unit
MC	Mission Capable
MRSP	Mobility Readiness Spares Package
MTBF	Mean Time Between Failure
NCA	National Command Authority
NGBS	Next Generation Bomber Study
OCA	Offensive Counterair
PC	Personal Computer
QDR	Quadrennial Defense Review
RAA	Required Assets Available (3 aircraft)
R&M	Reliability and Maintainability
RDT&E	Research, Development, Test and Evaluation
RNP	Required Navigation Performance
RVSM	Reduced Vertical Separation Minimum
SA	Situational Awareness
SAR	Synthetic Aperture Radar
SATCOM	Satellite Communication
SDB	Small Diameter Bomb
SEAD	Suppression of Enemy Air Defenses
SFW	Sensor Fused Weapon (CBU-97)
TCT	Time-Critical Targeting
TF	Training Coded or Terrain Following
UHF	Ultra High Frequency
USSTRATCOM	United States Strategic Command
VHF	Very High frequency
WCMD	Wind Corrected Munitions Dispenser (CBU-103 / 104 / 105)

EXECUTIVE SUMMARY

As a result of DoD transformation plans and recent operational experience (Air War Over Serbia and Operation ENDURING FREEDOM) portions of the 1999 *U.S. Air Force White Paper on Long Range Bombers* have become outmoded. In October 2001, the Secretary of the Air Force directed an updated Long-Range Strike Aircraft White Paper incorporating our new defense planning guidance. This document provides an update to the 1999 White Paper and reflects current decisions concerning bomber force structure and basing. While modification plans remain largely intact, the focus has been refined to support the Global Strike Task Force concept.

The Air Force will continue to upgrade its bomber fleet emphasizing improvements in lethality, survivability, supportability, and responsiveness. Whenever possible and practical, modernization will be accelerated and new technologies will be incorporated. Bombers will hold more targets at risk while battlespace information fusion and datalink reduce sensor-to-shooter timelines to minutes. Bombers will continue to dominate in the anti-access environment and allow for the application of air power at the times and places of our choosing.

The old axiom of one bomber striking one target with a large load of bombs no longer exists. While that is still a valuable bomber capability, we are often better served by one bomber striking several targets on a single mission. Therefore, the B-1, B-2, and B-52 should be thought of in terms of long-range high-payload multi-task strike assets, not just bomb-droppers.

While bombers share the common characteristics of long range, large payload and flexibility, each has unique capabilities and strengths to contribute to the warfighting scheme. The Air Force does not think of or advertise bombers as interchangeable. The B-1, B-2, and B-52 all have a specific mission area and each fills a particular combat niche.

B-1	B-2	B-52
		
• Conventional workhorse • Largest payload • Fastest, most agile	• Stealth penetrator • Denies enemy sanctuary • Most accurate bomber	• Long-range standoff • Key conflict enabler • Most diverse weapon load

SECTION I - PURPOSE

The 2001 Quadrennial Defense Review (QDR) states that the Department of Defense (DoD) is in a time of transition to a new era. New defense strategies are being developed to extend America's influence and preserve America's security. Four key goals will guide the development of U.S. forces and capabilities, their deployment and use:

- Assuring allies and friends of the United States' steadiness of purpose and its capability to fulfill its security commitments;

- Dissuading adversaries from undertaking programs or operations that could threaten U.S. interests or those of our allies and friends;

- Deterring aggression and coercion by deploying forward the capacity to swiftly defeat attacks and impose severe penalties for aggression on an adversary's military capability and supporting infrastructure; and

- Decisively defeating any adversary if deterrence fails.

The 2001 QDR further states that the basis for defense planning will shift from the old "threat-based" model to a new "capabilities-based" model. The focus will be on how an adversary might fight rather than specifically who an adversary might be or where a war might occur. This new direction in defense planning requires transformation and a new approach to assessing and managing risk.

As a result of DoD transformation plans and recent operational experience (Air War Over Serbia and Operation ENDURING FREEDOM), portions of the 1999 *U.S. Air Force White Paper on Long Range Bombers* have become outdated. In October 2001, the Secretary of the Air Force directed an updated Long-Range Strike Aircraft White Paper incorporating our new defense planning guidance.

This White Paper articulates long-range bomber force structure plans, modernization, capabilities, concept of operations, and replacement timeline. The paper is designed to reflect recent changes in strategic guidance and fiscal plans. It is a "snapshot" update and should not be used as a substitute for a detailed bomber roadmap, which is currently in development. Nor is this document meant to be all encompassing or restrictive in nature. Changes in the threat environment, advances in weapon technology, unforeseen increases in aircraft attrition, or any number of other variables are cause for modification, addition, or complete re-write.

SECTION II - FORCE STRUCTURE REQUIREMENTS

Current and Planned Bomber Force Structure

Today's bomber force structure is a legacy of the Cold War and the Nuclear Triad. Large numbers of widely dispersed bombers were required to maintain nuclear alert and deter aggression. While part of the bomber force still retains a nuclear mission, the emphasis has shifted to conventional operations, small-scale contingencies, and defeating global terrorism.

Our current fleet of 208 bombers (93 B-1s, 21 B-2s, 94 B-52s) will be reduced throughout 2002. To provide America with a smaller, more lethal, more survivable long-range strike force, 33 B-1s and 17 B-52s will be retired and B-1 bases will be reduced from five to two. Savings incurred from B-1 retirement and consolidation will be reinvested in the remaining B-1 force. In addition, one B-52H will be used to replace NASA's current B-52B heavy lift test aircraft.

Current force structure plans require a total of 157 bombers. Of that number, 96 will be combat-coded (CC), 28 will be used for training (TF), 7 will be used for test (EI and CB), and 26 will be used for backup (BAI) and attrition reserve (AR) (Table 2.1). Reducing the bomber fleet incurs some risk. However, this risk will be mitigated by modernizing the remaining aircraft -- our new long-range strike force will be more effective, more survivable, and more supportable. Figure 2.1 shows 2002 planned bomber basing locations and primary (combat-coded) aircraft assigned. With the exception of eight CC B-52s in the Air Force Reserve Command (AFRC), all bombers are Active Duty (AD) Air Force assets.

Aircraft	Combat	Training	Test	BAI / AR	Total
B-1	36	16	4	4	60
B-2	16	0	1	4	21
B-52	44	12	2	18	76
Totals	**96**	**28**	**7**	**26**	**157**

Table 2.1. Planned Total Bomber Force

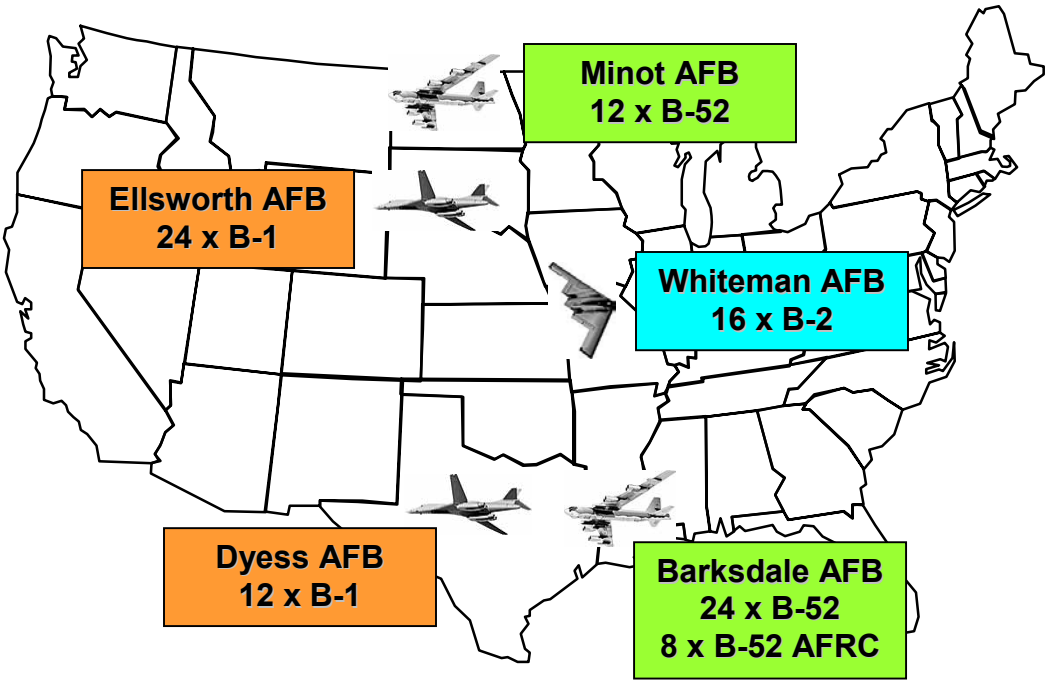

Figure 2.1. Planned Combat-Coded Bomber Force

SECTION III - BOMBER FORCE MODERNIZATION

The Air Force has long recognized the value of its bombers. However, our long-range strike force requires constant modernization to keep it relevant and effective. While the new transformation era has not changed our basic modernization plans - *increased lethality, survivability, supportability, and responsiveness* - it has added emphasis to certain upgrade areas. The latest Next Generation Bomber Study (NGBS) conducted by the Air Force reaffirmed our need to aggressively modernize the current bomber fleet. The NGBS also reiterated that it is far more cost-effective to upgrade current bombers than it is to procure new aircraft. Keeping this in mind, the Air Force's planned modernization balances fiscal reality and available technology.

Lethality

In the modern battlespace, the opportunity to detect, identify, and strike a target is often reduced to minutes. Datalink and beyond-line-of-sight (BLOS) secure communications are becoming more important as the pace of combat operations increase. Recent conflicts were characterized by bombers engaging in time-critical and “flex” targeting. Bombers need more advanced tools for in-flight mission planning and target prosecution. Advanced weaponry including the GBU-31 Joint Direct Attack Munition (JDAM) is already operational on all of our bombers. Whenever practical, the Air Force will also accelerate planned integration of newer weapons including the AGM-154 Joint Standoff Weapon (JSOW), the AGM-158 Joint Air-to-Surface Standoff Missile (JASSM), and the Small Diameter Bomb (SDB).

Survivability

Integrated air defense threats are becoming more lethal and prolific. To remain survivable, bombers require increased situational awareness (SA), updated self-defense systems, and standoff guided munitions. Datalink coupled with modern displays and upgraded electronic protection / electronic attack (EP / EA) systems will provide bombers with increased SA and survivability. Technology and new tactics built around information superiority will dramatically increase overall bomber effectivness. As demonstrated by bombers using temporary laptop devices during the Air War Over Serbia (AWOS), data links provide in-theater and BLOS real-time cockpit information ensuring greater mission success and survivability against the most lethal enemy threats. Fusing off-board and on-board information provides the crew with a complete battlefield picture that significantly increases lethality and survivability.

Supportability

Sustaining our bomber force at acceptable mission capable (MC) rates is one of the least visible and most ignored requisites for overall mission effectiveness. Aircraft require substantial investment in spare parts, sustainment engineering, software maintenance, and replacement of obsolete systems and support equipment. It will take years of careful vigilance and funding to maintain MC rates at an acceptable level. The current bomber fleet may be operational for the next 35 to 40 years. Upgrades to avionics, main processors, radar, displays, and navigation equipment are essential to keep the fleet effective and affordable.

Responsiveness

In order for a weapon system to be relevant, it must be responsive. The Air Force will emphasize minimizing sortie turn times and maximizing user-friendly maintenance and ordnance programs. Specialized maintenance facilities will be developed and pre-positioned at likely forward operating locations (FOLs). Upgrades will allow carriage of different weapon types on the same mission enhancing flexibility. In addition, providing units with a fully-stocked compliment of Mobility Readiness Spares Packages (MRSPs) for deployment and sustained combat operations will reduce the logistical trail back to Continnental United States (CONUS) bases.

Future Modernization

Future bomber modernization is guided by the 2001 QDR transformation philosophy, Air Force Core Competencies, warfighting commanders' operational needs, capability shortfalls, bomber concept of operations (CONOPs), and Aerospace Expeditionary Force (AEF) requirements. This section presents future modernization requirments in near, mid, and long-term. Near-term applies from fiscal years (FY) 2002 to 2007 (future years defense plan - FYDP), mid-term from FY 2008 to 2012, and long-term FY 2013 and beyond. In addition, this section provides a brief summary of each modernization program. The current planned FY03 ABES baseline modernization (RDT&E and Procurement) funding for the bomber force is depicted in Figure 3.1.

B-1, B-2, and B-52 Modernization Programs. Sections IIIA, IIIB, and IIIC describe specific modernization plans for the B-1, B-2, and B-52. Also see Appendix 1 for a summary of Long Range Strike Aircraft Capabilities/Modernization. Modernization programs described in this White Paper assume proposed FY03 ABES funding profile (Figure 3.1). As stated earlier, the bomber fleet requires a substantial funding commitment. The Air Force plans on spending over $6B throughout the FYDP upgrading bombers.

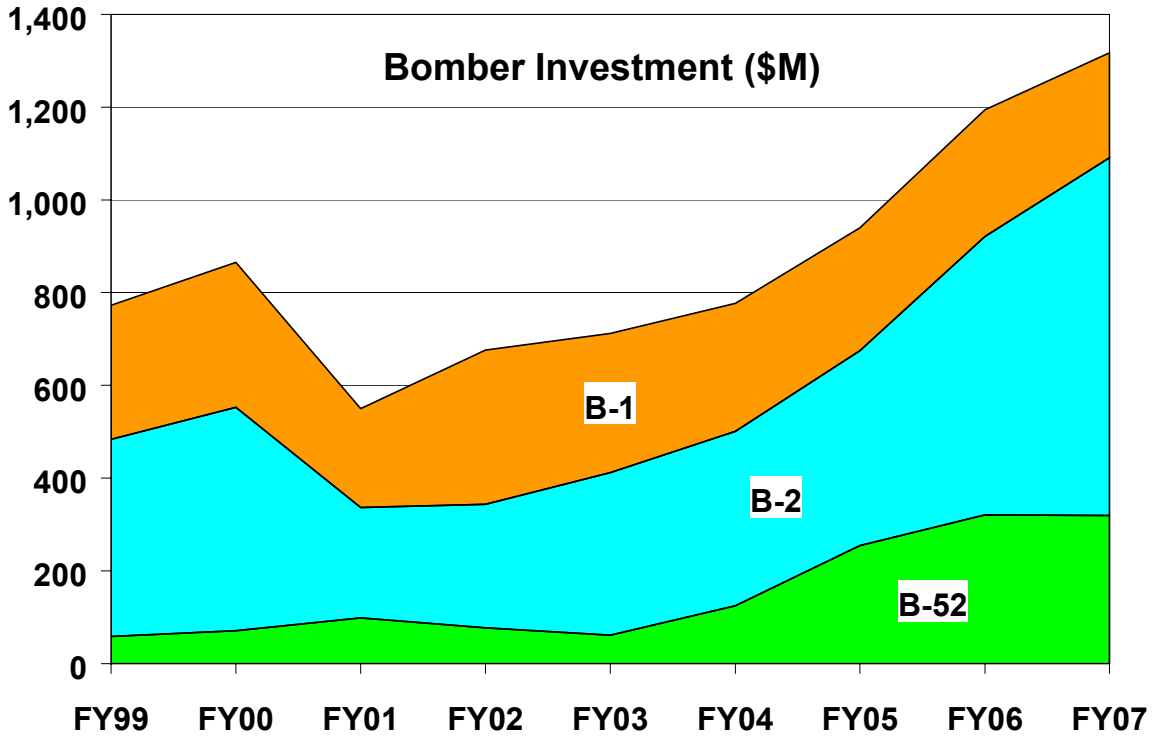

Figure 3.1. FY03 ABES Baseline Modernization Funding

Emerging Technology

Rapid advances in technology can significantly increase bomber lethality, survivability, supportability, and responsiveness. Integration of emerging technologies will enable bombers to successfully execute missions and kill more targets in an increasingly lethal and diverse battlespace. As these technologies mature, we will assess their contribution to improving data-fusion, precision weapons capability, and sortie generation.

SECTION IIIA - B-1 MODERNIZATION PLANS

B-1 Near-Term Upgrades (FY02 to FY07)

FY03 ABES Upgrade	Near-Term (Fiscal Year)							
	00	01	02	03	04	05	06	07
B-1								
Block E - Computer / WCMD	⇧	⇧	⇧	⇧	⊕	⇧	⇧	⇧
Block F - Defensive Sys Upgrade Program (DSUP)	⇧	⇧	⇧	⇧	⇧	⇧	⊕	⇧
Digital Engine Control (DEC)	⇧	⇧	⇧	⊕	⇧	⇧		
JASSM Integration	⇧	⇧	⇧	⇧	⊕			
Intermediate Automatic Test Equipment (IATE)				⇧	⇧	⇧	⊕	⇧
Radar Reliability Improvement				⇧	⇧	⇧	⇧	⊕
Interim Datalink	⇧			⊕				
Integrated Datalink (Link-16)				⇧	⇧	⇧	⇧	⊕08
Airborne Digital Recorder				⇧	⊕	⇧		
Joint Mission Planning System (JMPS) Transition						⇧	⇧	⊕
Central Int Test Sys / Elec Multiplex (CITS / EMUX)						⇧	⇧	⊕
Conventional Bomb Module Test Sets (CBMTS)						⇧		
Mission Readiness Spares Package (MRSP) Kits	⇒	⇒		⇧	⇧	⇧	⇧	⇧
Inertial Navigation System (INS) Upgrade							⇧	⊕09
Small Diameter Bomb (SDB) Integration							⇧	⊕ 09
Vertical Situation Displays (VSDs)								⊕ 10
Legend	⇧ Funded	⇒ Partially Funded	⇩ Not Funded	⊕ IOC or RAA				

Table 3.1. B-1 Near-Term Modernization

Block E - Computer / WCMD. This modification increases the B-1's conventional weapons capability by replacing six Avionics Computer Units (ACUs) with four upgraded ACUs and upgrades two Data Transfer Units (DTUs), and provides Conventional Bomb Module Test Set (CBMTS) support equipment. The upgrade enables simultaneous carriage of three different weapon types (weapon flexibility) and greatly reduces software maintenance costs. As part of this upgrade, Wind Corrected Munitions Dispenser (WCMD) bomb module kits are being procured for 60 B-1s.

Block F - Defensive System Upgrade Program (DSUP). The Defensive System Upgrade Program replaces the B-1's ALQ-161 defensive suite with portions of the Integrated Defensive Electronic Countermeasure (IDECM) system and the ALE-55 fiber optic towed decoy. The ALQ-161 has no growth capability

to counter future threats and is a high-maintenance system. DSUP provides the B-1 with a much more capable and upgradeable defensive system, eliminates 90 line replaceable units (LRUs), and reduces aircraft weight by 4000 pounds.

Digital Engine Control (DEC). Current analog engine controllers are becoming unsupportable. DEC replaces the existing analog augmenter fan temperature (AFT) control and Central Integrated Test System (CITS) processor on the F101 Engine. The DEC includes drop-in replacement boards, built-in diagnostics and reprogramming capability. It is interchangeable with existing equipment and replaces the AFT control and relegates the CITS processor to a pass-through function. Kits will be installed as an organizational level modification. The program will modify the entire pool of 441 B-1 engines.

Joint Air-to-Surface Standoff Missile (JASSM) Integration. The AGM-158 JASSM is a 2000-pound class precision standoff cruise missile with a 1000-pound unitary warhead. Weapon navigation is controlled by a GPS-aided INS and terminal guidance is provided by an imaging infrared seeker and target recognition system. JASSM is designed to strike both fixed and relocatable targets from ranges outside enemy air defenses.

Intermediate Automatic Test Equipment (IATE). Replaces current back shop repair equipment with up-to-date, supportable repair stations. Also, modifies current IATE to keep them usable and supportable.

Radar Reliability Improvement. Project addresses diminishing manufacturing source and reliability issues with the Radar Receiver Transmitter and Radar Signal Processor by leveraging similar technology from the F-16 program. In addition, this upgrade sets the foundation for future performance improvements such as one foot Synthetic Aperture Radar (SAR) resolution.

10 Interim Datalinks. Provides ten shipsets of laptop datalink equipment with line-of-sight (LOS) Link-16 and BLOS UHF SATCOM datalink capability. Datalinks provide real-time SA to the B-1 aircrew and the capability to relay command and control (C2) information including target changes while enroute to the target area.

Integrated Datalink (Link-16). Provides LOS data connectivity for aircraft-to-aircraft and aircraft-to-C2. Link-16 is a combat force multiplier enabling interoperability between joint U.S. and allied military services. It greatly enhances tactical Command, Control, Communication, and Intelligence (C3I) mission effectiveness and increases survivability. Link-16 develops a real-time picture of the theater battlespace and enables rapid sharing of information. In addition to LOS capability, the B-1's datalink will include BLOS connectivity increasing flexibility essential for attacking time-sensitive targets.

Airborne Digital Recorder. Corrects combat and training deficiency. Provides pilot Threat Situational Awareness System (TSAS) along with a front cockpit display video recording capability.

Joint Mission Planning System (JMPS). JMPS is the next planned iteration in the Air Force Mission Planning Support System (AFMSS) Program. It is intended to provide a flexible, tailored, and scalable mission planning system using normal personal computer (PC) programs. JMPS provides efficient mission planning for guided munitions to include large loadout weapons like the SDB.

Central Integrated Test System / Electrical Multiplex System (CITS / EMUX). Computer hardware / software upgrade for the B-1 CITS and EMUX systems. Current processors are at maximum memory / throughput. Replacement system enhances troubleshooting diagnostic system, improving turn times and reducing maintenance costs.

Conventional Bomb Module Test Set (CBMTS). Replaces unsupportable and functionally deficient Pylon Launcher Missile Simulator (PLMS) with 18 new versions of the CBMTS.

Mobility Readiness Spares Package (MRSP) Kits. MRSP Kits contain spare parts specifically for deployment and combat operations. Fully funded and supplied MRSPs are required to maintain aircraft at acceptable mission capable rates without reaching back to CONUS supply depots.

Inertial Navigation System (INS) Upgrade. A form-fit-function laser-based Gyro Stabilization System (GSS) replacement of the existing high-failure INS. The current INS contains an older-style spinning mass gyro, which is fast approaching non-supportability due to obsolescent technology and potential diminishing manufacturing sources.

Small Diameter Bomb (SDB) Integration. The SDB is a near-precision winged 250-pound class glide weapon with moderate off-axis and standoff capability. Weapon accuracy and high loadout will enable massive conventional attack. The B-1 is expected to carry between 96 and 288 SDBs on one sortie.

Vertical Situation Displays (VSDs). VSDs are primary flight instruments for B-1 pilots / co-pilots. Current VSDs are becoming unsupportable due to outdated technology, aging avionics, and vanishing vendors. VSDs will be replaced with commercial off-the-shelf (COTS) color displays suitable for graphic-intensive combat operations including datalink.

B-1 Mid-Term Upgrades (FY08 to FY12)

Global Air Traffic Management (GATM). GATM is a navigation and communication standard mandated by the International Civil Aviation Organization (ICAO) to accommodate increased global air traffic and tighter navigation frequency tolerances. Implementation ensures continued peacetime access to worldwide airspace. The Air Force is assessing bomber operations against the levied GATM requirements. B-1 GATM requirements include FM Immunity, Mode S IFF, and Required Navigation Performance 4 (RNP-4).

Cockpit Upgrade Program (CUP). Current B-1 cockpit display units are incapable of supporting graphic intensive software modifications. The CUP installs a robust graphic capability via common display units throughout the front and aft stations. This program increases B-1 survivability by providing critical situational awareness needed for combat operations. In addition, CUP provides necessary presentations for future guided munitions and datalink integration.

Digital Flight Control System. Reliability and Maintainability (R&M) upgrade to replace nine analog flight control LRUs with two digital controllers and an updated central air data computer. The current flight control system is a primary maintenance driver for the B-1. Replacement system will improve MTBF from 30 to 2500 hours.

B-1 Long-Term Upgrades (FY13 and Beyond)

Radar Upgrade. This upgrade improves the current SAR resolution from eight feet to one foot or better and enhances the B-1's ability to precisely find, fix, track, and engage enemy targets with guided direct-attack or standoff munitions (JDAM / JSOW / SDB). This SAR upgrade also replaces older, less reliable components.

SECTION IIIB - B-2 MODERNIZATION PLANS

B-2 Near-Term Upgrades (FY02 to FY07)

FY03 ABES Upgrade	Near-Term (Fiscal Year) 00	01	02	03	04	05	06	07
B-2								
Link 16 / Center Instr Display / Inflight Replanner	⇧	⇧	⇩	⇧	⇧	⇧	⊕	⇧
EGBU-28 Integration	⇧	⇧	⇩	⇧	⊕			
JASSM Integration	⇧	⇧	⇧	⊕				
B-2 Shelter System	⇧			⇧	⊕			
500-Pound JDAM Integration		⇧	⇧	⇧	⊕	⇧		
Extremely High Frequency (EHF) SATCOM		⇧	⇧	⇧	⇧	⇧	⇧	⊕ 08
Ultra High Frequency (UHF) SATCOM			⇒	⇧	⇧	⊕	⇧	⇧
Joint Mission Planning System (JMPS) Integration				⇧	⇧	⇧	⇧	⊕ 08
Small Diameter Bomb (SDB) Integration				⇧	⇧	⇧	⇧	⊕ 09
Radar Upgrade				⇧	⇧	⇒	⇒	⇒
Digital Engine Controller (DEC)				⇧	⇧	⊕	⇧	
Alternate High Frequency Material (AHFM)					⇧	⊕	⇧	⇧
Low Observables Maintenance Upgrades						⇧	⇧	⊕ 10
Spares for 2nd Independant Sqadron					⇩	⇩	⇩	⇩
Global Air Traffic Management (GATM)					⇩	⇩	⇩	⇩

Legend	⇧ Funded	⇒ Partially Funded	⇩ Not Funded	⊕ IOC or RAA

Table 3.2. B-2 Near-Term Upgrades

Link-16 / Center Instrument Display / In-Flight Replanner (CID / IFR). In addition to Link-16, this B-2 modification includes a new center instrument display (CID) and a very basic in-flight replanning (IFR) capability. The CID provides a graphic display to handle large amounts of threat and SA information. As SA improves, the ability to replan routes will also increase. The IFR will be a basic graphic system with no low observable auto routing capability.

Enhanced GBU-28 (EGBU-28). Recent combat experience demonstrated the advantages of an all-weather weapon capable of penetrating hard and deeply-buried targets. The EGBU-28 is a 5000-pound class GPS-aided / INS-guided "bunker buster" designed to replace the interim GBU-37.

Joint Air-to-Surface Standoff Missile (JASSM) Integration. The AGM-158 JASSM is a 2000-pound class precision standoff cruise missile with a 1000-pound unitary warhead. Weapon navigation is controlled by a GPS-aided INS and terminal guidance is provided by an imaging infrared seeker and target recognition system. JASSM is designed to strike both fixed and relocatable targets from ranges outside enemy air defenses.

B-2 Shelter System. The B-2 Shelter System facilitates low observable (LO) maintenance at FOLs.

500-Pound JDAM. Accurate, all-weather, GPS-aided general purpose bomb. The 500-pound JDAM is the first step toward high-intensity combat capability, allowing the B-2 to strike 80 targets on one mission.

Extremely High Frequency (EHF) SATCOM. The DoD requires survivable communications media for command and control of nuclear forces. To satisfy the requirement, the Air Force plans to deploy an advanced EHF satellite communications constellation. The B-2 will integrate an EHF communication capability satisfying USSTRATCOM connectivity requirements as well as providing a high data rate capability to support tactical conventional missions.

Ultra High Frequency (UHF) SATCOM. Provides BLOS connectivity similar to EHF SATCOM. The UHF SATCOM program replaces current UHF / VHF radios with the Airborne Integrated Terminal (AIT) to provide secure jam-resistant (Have Quick II) LOS capability. AIT also delivers the GATM required 8.33kHz frequency spacing required for European operations. This terminal allows receipt of mission targeting data, route changes, and mission data file updates.

Joint Mission Planning System (JMPS). JMPS is the next planned iteration in the AFMSS Program. It is intended to provide a flexible, tailored, and scalable mission planning system using normal PC programs. JMPS provides efficient mission planning for guided munitions to include large loadout weapons like the SDB.

Small Diameter Bomb (SDB) Integration. The SDB is a near-precision winged 250-pound class glide weapon with moderate off-axis and standoff capability. Weapon accuracy and high loadout will enable massive conventional attack. The B-2 is expected to carry between 64 and 192 SDBs on one sortie.

Radar Upgrade. The Air Force is required to relocate the B-2 radar operating frequency to avoid significant frequency interference.

Digital Engine Controller (DEC). Replaces high-maintenance analog engine controllers.

Alternate High Frequency Material (AHFM). One of the greatest challenges facing B-2 maintainers is the man-hours required to support and repair damaged LO surfaces. AHFM will replace the majority of the lower aircraft surface tape with a permanent coating and quick access panels for routine maintenance.

Low Observable Maintenance Upgrades. This effort consists of three separate programs: a new, more durable LO engine tailpipe coating, an improved and more maintainable engine exhaust trailing edge section, and an advanced intermediate service door edge treatment to replace current blade and flex seals. These upgrades will reduce maintenance man-hours and improve mission capability rates.

Mission Readiness Spares and Support Equipment for 2nd Independent Squadron. Due to limited manpower, spares and support equipment, B-2s can only deploy to a single FOL. The ability to deploy each B-2 squadron to separate FOLs simultaneously would provide greater flexibility to supported CINCs.

Global Air Traffic Management (GATM). GATM is a navigation and communication standard mandated by the ICAO to accommodate increased global air traffic and tighter navigation frequency tolerances. Implementation ensures continued peacetime access to worldwide airspace. B-2 GATM requirements include reduced vertical separation minimum (RVSM), RNP-4, and IFF Mode S.

B-2 Mid-Term Upgrades (FY08 to FY12)

Computers Replacement. Despite being our newest bomber, the B-2's computers and processors are rapidly approaching information saturation. With advances in computer technology and increased demands on the system, the B-2's computers will need to be replaced with state-of-the-art processors. Although reliable, maintaining the present processors will become increasingly difficult and costly. Expanded and more reliable systems are necessary to maintain the B-2's leading edge combat capabilities.

Displays. Replacement program for display processor unit and multipurpose display units to provide more supportable and capable cockpit displays.

Wind Corrected Munitions Dispenser (WCMD) Integration. WCMD is a "smart" cluster weapon that compensates for high-altitude winds. WCMD integration will give the B-2 more accurate placement of anti-personnel and anti-armor cluster weapons.

Mixed Conventional Loads Pattern Management (MCLPM). MCLPM provides the ability to target and release four different smart weapons types against multiple targets on a single pass. The B-2 typically strikes high-value, heavily defended, high-priority targets. MCLPM provides the necessary flexibility to prosecute widely varied hard and soft targets on one mission.

Information Fusion. Fuses high-volume, real-time cockpit information from Link-16, UHF SATCOM and Advanced Extremely High Frequency (AEHF) datalinks into an unambiguous presentation increasing overall SA.

B-2 Long-Term Upgrades (FY13 and Beyond)

Signature Improvements. The B-2's LO "stealth" signature meets operational requirements against today's threats. However, as sophisticated air defense systems proliferate, further signature reduction is required to maintain and increase B-2 survivability.

SECTION IIIC - B-52 Modernization Plans

B-52 Near-Term Upgrades (FY02 to FY07)

FY03 ABES Upgrade	Near-Term (Fiscal Year)							
	00	01	02	03	04	05	06	07
B-52								
Avionics Midlife Improvement (AMI)	⇧	⇧	⇧	⇧	⇧	⇧	⊕	⇧
JASSM Integration	⇧	⇧	⇧	⊕				
Sit Awareness Defensive Improvement (SADI)		⇧	⇧	⇧	⇧	⇧	⊕	⇧
Elec Countermeasures Improvement (ECMI)		⇧	⇧	⇧	⊕	⇧	⇧	⇧
EHF - Family Airborne Terminal (FAB-T)					⇧	⇧	⇧	⊕ 08
Global Air Traffic Management (GATM)						⇧	⇧	⇧
Tactical Datalink						⇧	⇧	⇧
CALCM In-Flight BLOS Rapid Retasking (CIBR2)					⇒	⇒	⇧	⇧
1760 Weapons Interface to Bomb Bay					⇩	⇩	⇒	⇒
Joint Mission Planning System (JMPS) Integration					⇩	⇩	⇩	⇩
Crash-Survivable Flight Data Recorder (CSFDR)					⇩	⇩	⇩	⇩
Electro-Optical Viewing System (EVS)					⇩	⇩		

Legend	⇧ Funded	⇒ Partially Funded	⇩ Not Funded	⊕ IOC or RAA

Table 3.3. B-52 Near-Term Modernization

Avionics Midlife Improvement (AMI). The Avionics Midlife Improvement (AMI) program upgrades the INS, ACU, and the Data Transfer System. The current INS technology is obsolete and on-hand spares will be depleted by FY05. The ACU is 1970s technology which has reached its capacity to integrate new / future avionics and weapons.

Joint Air-to-Surface Standoff Missile (JASSM) Integration. The AGM-158 JASSM is a 2000-pound class precision standoff cruise missile with a 1000-pound unitary warhead. Weapon navigation is controlled by a GPS-aided INS and terminal guidance is provided by an imaging infrared seeker and target recognition system. JASSM is designed to strike both fixed and relocatable targets from ranges outside enemy air defenses.

Situational Awareness Defensive Improvement (SADI). The SADI program replaces the B-52's primary SA builder - the ALR-20 panoramic receiver system. The current system uses 1960's-era technology, which is no longer supportable.

Electronic Countermeasures Improvement (ECMI). ECMI is an R&M initiative. ECMI replaces two high-failure rate components with two low MTBF components, and replaces two control and display units (CDU) with one CDU. The current ALQ-172 is out of memory and can no longer be modified to counter modern threats.

EHF - Family Airborne Terminals (FAB-T). USSTRATCOM requires survivable and assured global communications from the SATCOM system. Current UHF SATCOM capability is decaying and will not be replaced. In order to maintain connectivity, the B-52 UHF SATCOM terminal will be replaced with an EHF terminal to provide Single Integrated Operation Plan (SIOP) Emergency Action Message (EAM) receive capability. The Air Force initiated the FAB-T program to install a family of EHF wideband terminals on several different platforms to facilitate communication over multiple satellite systems.

Global Air Traffic Management (GATM). GATM is a navigation and communication standard mandated by ICAO to accommodate increased global air traffic and tighter navigation frequency tolerances. Implementation ensures continued peacetime access to worldwide airspace. B-52 GATM requirements include FM Immunity, a Digital Air Data system, RVSM, Mode S, and RNP-4.

Tactical Datalink. LOS datalink that uses structured message formats to provide real-time network and digitized tactical information. Link-16 vastly increases B-52 SA, survivability, and overall mission effectiveness.

CALCM In-Flight Beyond-Line-of-Sight Rapid Retasking (CIBR2). CIBR2 provides CALCM dynamic retargeting capability. To enhance CALCM flexibility on long-duration missions, CIBR2 provides BLOS receive capability and mission file download for in-flight weapon re-tasking.

1760 Weapons Interface to the Bomb Bay. The B-52 can currently carry smart weapons only on external pylons. 1760 in the bay allows internal carriage and increased loadouts of WCMD, JDAM, JSOW, JASSM, and SDB.

Joint Mission Planning System (JMPS). JMPS is the next planned iteration in the AFMSS Program. It is intended to provide a flexible, tailored, and scalable mission planning system using normal PC programs. JMPS provides efficient mission planning for guided munitions to include large loadout weapons like the SDB.

Crash-Survivable Flight Data Recorder (CSFDR). The CSFDR supports mishap investigations. The Air Force must be capable of expediently determining the causes of mishaps, anticipating equipment failures, and detecting faulty operational procedures that would result in future mishaps. AF

Policy Directive (AFPD) 63-14, dated 6 Feb 01, mandates Air Force mishap investigative information gathering equipment as mission essential.

Electro-Optical Viewing System (EVS). The EVS system provides a Forward Looking Infrared (FLIR) sensor and Steerable Television for night and weather operations. This is a R&M upgrade that combines three LRUs into one highly reliable unit with an estimated MTBF of 4400 hours.

B-52 Mid-Term Upgrades (FY08 to FY12)

Link-16. A LOS datalink that uses structured message formats to provide real-time network and digitized tactical information. Link-16 will vastly increase B-52 SA, survivability, and overall mission effectiveness.

B-52 Long-Term Upgrades (FY13 and Beyond)

Small Diameter Bomb (SDB) Integration. The SDB is a near-precision winged 250-pound class glide weapon with moderate off-axis and standoff capability. Weapon accuracy and high loadout will enable massive conventional attack. The B-52 is expected to carry between 48 and 144 SDBs on one sortie.

SECTION IV - BOMBER CAPABILITIES

Bomber Characteristics

Bombers share the common characteristics of long range, large payload and flexibility. However, each also has unique capabilities and strengths to contribute to the warfighting scheme.

Range. Bombers can launch from the CONUS and reach any point on the globe with precise, lethal strikes in less than 24 hours. Typical bomber combat radius is in excess of 2000 nautical miles. With in-flight refueling, range is essentially unlimited. Long range is also synonymous with long loiter times.

Payload. Typical bomber payload exceeds 20 tons. Each employs a variety of precision, GPS-aided / INS-guided standoff and direct attack ordnance. Figure 4.1 shows sample weapons loadouts for various combat aircraft (bomber SDB loadout may change depending on final bomb rack configuration). Bombers routinely carry mixed payloads, optimizing their ability to support theater combat requirements.

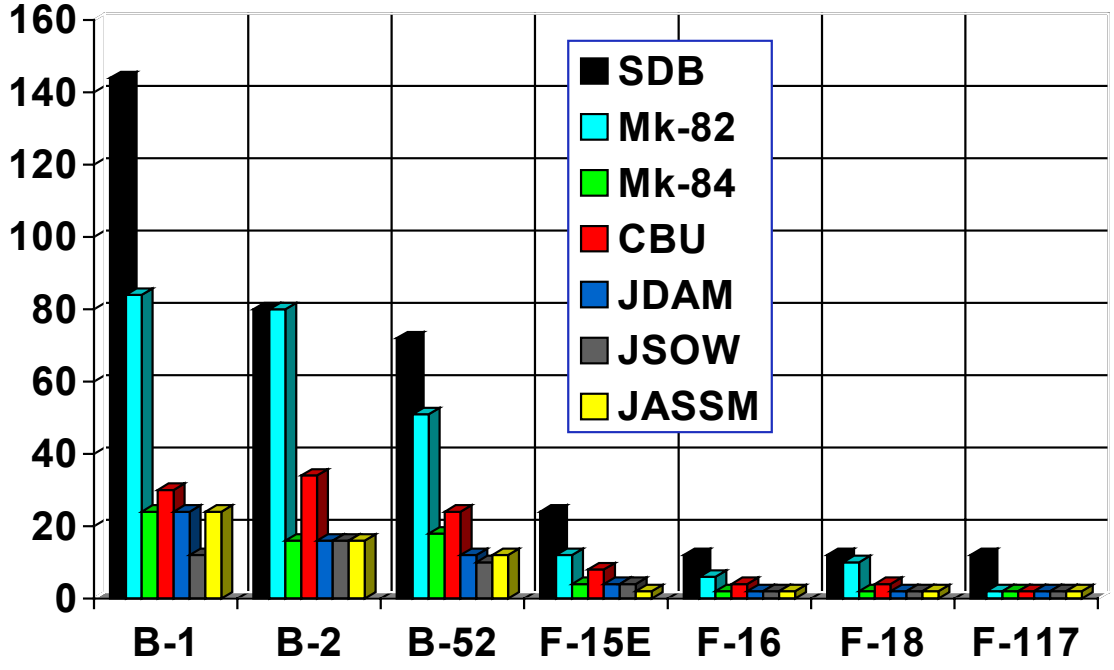

Figure 4.1. Ordnance Loadout Comparison

Flexibility. Bombers are true all-weather, day / night strike platforms offering the flexibility to accomplish multiple missions per sortie. They conduct standoff, direct attack, time-critical-targeting (TCT) and deep strike missions as the situation permits. Mixed weapon loads allow the flexibility to strike various types of targets on a single sortie.

B-1. The B-1 is a conventional-only strike platform. Targets are identified with Synthetic Aperture Radar (SAR) and ordnance can also be employed using GPS / INS coordinates. Ground Moving Target Indicator / Track (GMTI / GMTT) radar modes allow detection and engagement of mobile targets. The B-1's speed and maneuverability allow responsiveness and seamless integration with composite strike packages. A Terrain Following (TF) system allows all-weather, day / night, low-altitude operations. With three weapons bays, the B-1 has the largest and most flexible payload of the three bombers.

B-2. The B-2 is a conventional / nuclear strike platform. Stealth technology (radar cross section, infrared, visual, and acoustic signature) allows penetration and direct attack against sophisticated high-threat Integrated Air Defense Systems (IADS). The B-2 requires minimal support (Offensive Counter Air, Suppression of Enemy Air Defenses) and eliminates enemy sanctuary - the only bomber capable of delivering 5000-pound class penetrator weapons designed specifically for hardened / deeply buried targets. The B-2 can fly low-altitude all-weather operations using TF. In addition, the B-2 achieves near-precision accuracy using the GPS-Aided Targeting System (GATS).

B-52. The B-52 is a conventional / nuclear strike platform. The only bomber capable of delivering long-range AGM-86C Conventional Air Launched Cruise Missiles (CALCM), the AGM-142 Have Nap and the AGM-84D Harpoon anti-ship cruise missile. The B-52 is a critical enabler in any conflict. The B-52 can deliver the widest variety of standoff and direct attack air-to-surface munitions in the entire Air Force inventory.

Bomber Weapons

Bombers carry a wide variety of guided and unguided, standoff and direct-attack munitions. Standoff weapons enhance aircraft survivability by allowing the launch aircraft to remain outside the range of enemy defenses (Theater, Area, or Point). Direct attack ordnance are non-standoff weapons used against point and area targets to provide near-precision and precision accuracy. Guidance is normally via GPS / INS inputs. The B-52 can also drop laser-guided weapons if provided with buddy lasing. Unguided, direct attack weapons include the Mk-82 (500-pound class GP), Mk-84 (2000-pound class GP), the M-117 (750-pound class Blast) bombs, and various cluster bomb units (CBU-87, CBU-89, CBU-97). Quickstrike and CBU-89 Gator land mines are designed for area denial. Mk-56

moored mines and Quickstrike marine variants are used for naval (anti-ship) operations. Normally, U.S. Air Force bomber mine employment will be in support of U.S. Navy operations and require Navy mine assembly support. Mines are effective against many ship classes, but their primary function is to harass / slow shipping operations and deny access to shipping lanes and ports.

Weapon	B-1	B-2	B-52
Standoff			
AGM-84D Harpoon			8*
AGM-86C CALCM			20
AGM-142 Have Nap			3 + Pod*
AGM-154 JSOW	12 (FY04)	16	12 (FY02)*
AGM-158 JASSM	24 (FY04)	16 (FY03)	12 (FY03)*
Small Diameter Bomb (SDB)	96-288(FY08)	64-192(FY09)	48-144(FY12)
AGM-86B ALCM (Nuclear)			20
AGM-129A ACM (Nuclear)			12
Direct Attack (Guided)			
GBU-10 Paveway II LGB			10**
GBU-12 Paveway II LGB			10**
GBU-31 JDAM	24	16	12*
GBU-37 GAM		8	
EGBU-28		8 (FY04)	
CBU-103 / 104 / 105 (WCMD)	30 (FY03)		16*
500-pound JDAM		80 (FY04)	
Direct Attack (Unguided)			
Mk-82 500-pound General Purpose	84	80	45
Mk-84 2000-pound General Purpose	24	16	18
M-117 750-pound Blast		36	45
CBU-87 / 89 / 97 Cluster Munitions	30 / 30 / 30	34 / 34 /34	24 / 24 / 0
B-61 and B-83 (Nuclear)		16	8
B-61-11 (Nuclear)		16	
Mines			
Mk-56 Moored Mine			20
Mk-62 Quickstrike 500-pound Mine	84	80	45
Mk-63 Quickstrike 1000-pound Mine			18
Mk-65 Quickstrike 2000-pound Mine	8		18

*Note: External carriage only, weapons bay is available for mixed load capability.
**Note: External carriage only, requires buddy lasing.

Table 4.1. Bomber Weapons Carriage Capability

SECTION V - BOMBER CONCEPT OF OPERATIONS

Role of the Heavy Bomber

The role of the heavy bomber has evolved from "dumb bomb" dropper to long-range precision weapon system. New ordnance and employment procedures have redefined how we use and think of our heavy bomber force. B-1s, B-2s, and B-52s all carry a variety of highly accurate and flexible weapons. They can employ from forward locations or strike from the CONUS. Pre-planned "fixed" targets are still a staple of bomber operations, but "time-critical" mobile and re-locatable targets are being progressively held at risk by our bomber force.

In addition, the traditional missions normally segregated to either bombers or fighter aircraft are becoming less well defined. Bombers have historically been tasked for deep penetration and interdiction against large area targets. However, today's bomber force is just as likely to strike point targets with single GPS-aided bombs or support ground troops in weather conditions that hinder other Close Air Support (CAS) platforms. Large numbers of precision standoff weapons also give our bombers a significant Suppression / Destruction of Enemy Air Defenses (SEAD / DEAD) capability. Bombers also perform sea interdiction missions with mines and direct engagement of surface shipping with standoff missiles.

The old axiom of one bomber striking one target with a large load of bombs no longer exists. While that is still a valuable bomber attribute, we are often better served by one bomber striking several targets on a single mission (Figure 5.1). Therefore, the B-1, B-2, and B-52 should be thought of in terms of long-range strike platforms, not just bomb-droppers.

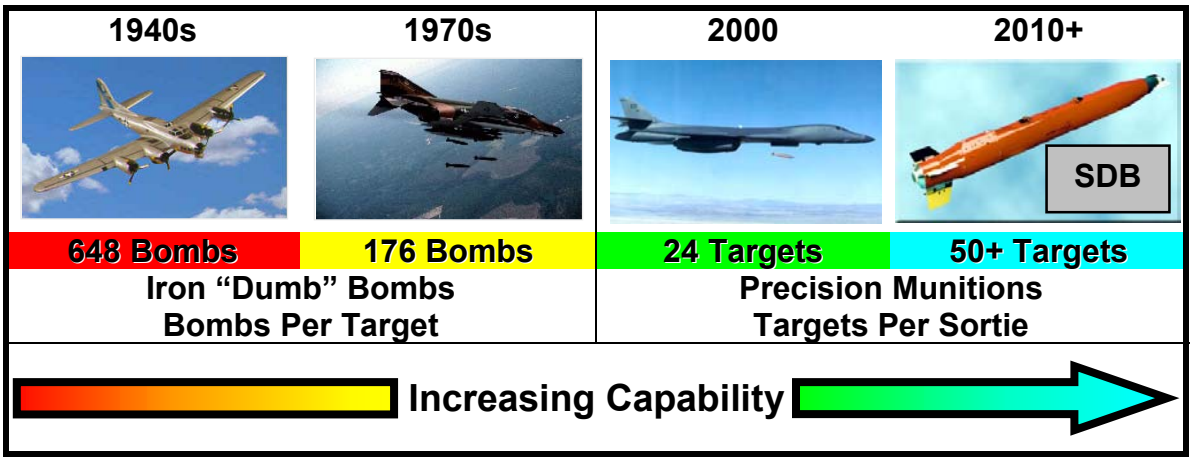

Figure 5.1. Increasing Bomber Effectiveness

General

Regardless of the mission type (Interdiction, CAS, OCA, Counterland, etc.), bomber operations involve employing large amounts of ordnance to destroy large numbers of targets. The role of the bomber is to deter enemy attack upon our forces and those of our allies, and if required, to strike with sufficient precision and firepower to eviscerate the enemy's warfighting capability. Specific weapon types and tactics are dictated by target and threat environment. As a general guideline, initial combat phases involve Integrated Air Defense System (IADS) degradation to enable direct attack and deeper penetration into hostile airspace. As conflict progresses, target / ordnance combinations are designed to maximize combat effectiveness and produce effects commensurate with theater CINC objectives.

Bombers play a unique and versatile role in National strategic policy and doctrine. American bombers support U.S. Air Force doctrine by performing several basic Aerospace Power functions and roles listed in *Air Force Basic Doctrine*, Air Force Doctrine Document 1 (AFDD 1) and delineated in *Air Warfare*, Air Force Doctrine Document 2-1 (AFDD 2-1).

Nuclear Operations. Although this CONOPs mainly discusses conventional operations, the B-2 and B-52 also support USSTRATCOM-assigned nuclear operations as one-third of the nuclear triad. The nuclear mission contributes to strategic deterrence while maintaining the capability to deliver nuclear weapons across the complete spectrum of conflict.

Aerospace Expeditionary Force (AEF). The Air Force groups aerospace capability into pre-determined sets of forces (aircraft, equipment, personnel) known as the Aerospace Expeditionary Force (AEF). The AEF construct positions air combat capability into specific theaters in response to potential hotspots, provides forward presence, or enables global strike in anti-access environments. In addition to normal AEF rotations, bombers are always tasked to support the two "on-call" crisis-response Aerospace Expeditionary Wings (AEWs). Upon warning order notification, bombers are generated for worldwide operations.

Global Strike Task Force (GSTF). GSTF will be the Air Force's "kick-down-the-door" force to counter a potential adversary's anti-access capabilities - both political and physical. GSTF will rapidly establish air dominance and subsequently guarantee that joint aerospace, land, and sea forces will enjoy freedom from attack and freedom to attack. This concept will hinge on the inherent "heavy lifting" and long-range capabilities of bombers. Bombers provide a global and rapid response, precision and standoff strike capability, assured

access for follow-on joint forces, 24 / 7 battlespace persistence, and robust time-critical targeting (TCT) capability.

Bombers will target the enemy's anti-access weapons, launch sites, and C2, rolling back warfighting systems and degrading combat capability. As they do today, bombers will provide substantial firepower where and when we need it most - against our adversary's anti-access forces in the early days of a conflict.

Persistent stand-off and direct-attack bomber strikes will continue after the initial salvos. Bombers will increase attack intensity while deployed at FOLs. As the fixed target set decreases, bombers and fighters will set up on-station combat air patrols (CAPs) for TCT.

Global Power (GP). Global Power is the unclassified name for long-range (out-of-CONUS) "show the flag" bomber training missions designed to support our allies and deter potential enemies. GP exercises the AEF concept and prepares bomber aircrews for global operations. Aircrew gain real-world experience and exercise C2 systems. GP missions include: CONUS-Employ-CONUS, CONUS-Employ-Deploy, and CONUS-Deploy-Employ.

Forward Presence. Forward Presence is triggered by an NCA request for bomber forces in response to developing crisis. Forward presence is a coercive, flexible, multiple effects-based foreign policy strategy that is exercised by Global Power missions. The psychological and political impacts of deploying bomber aircraft to worldwide FOLs demonstrates U.S. resolve and has the ability to decisively shape world events. The presence of bomber aircraft at the FOL, or even associated bomber support build-up, may deter belligerent aggression.

Currently, bomber units do not regularly deploy in-theater with parent AEWs. However, forward deployment with an AEW is the ideal and preferred means to maximize bomber responsiveness. Shortened mission durations significantly increase number of sorties generated per day, which directly translates into increasing the overall number of targets destroyed. Air refueling tanker requirements are dramatically reduced or eliminated.

Forward Operating Locations (FOL). In contrast to CONUS basing, FOLs provide greater coverage and reduced response times to potential Areas of Responsibility (AORs). Sortie generation rates are higher and tanker refueling support is significantly reduced or eliminated (see Figure 5.2).

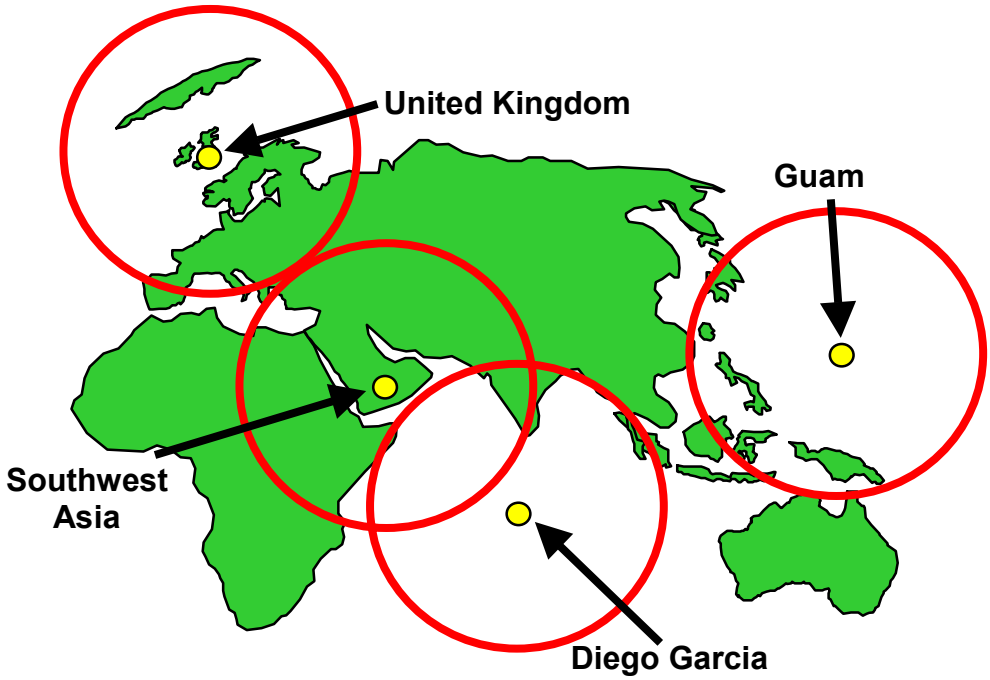

Figure 5.2. Typical Bomber FOLs and Unrefueled Combat Radii

Employment Options

Several employment options are available for conventional bomber operations. Long range and heavy payload offer unequaled flexibility to theater CINCs. Bombers can project precision strike power from the CONUS to any AOR. In the opening hours of a conflict, bombers offer the warfighting CINCs all-weather firepower without prior deployment delays. Three employment options are described below.

CONUS-Employ-CONUS. This option allows warfighting CINCs to employ bombers from bases in the U.S. With tanker refueling support, bombers can reach any worldwide AOR. However, long mission durations and aircrew availability reduce sortie generation and rate of target destruction. This employment option was used by B-52 CALCM sorties for the opening shots in Operation DESERT STORM, and B-2s during Operation ALLIED FORCE flying missions from Whiteman AFB, Missouri to the Kosovo AOR.

CONUS-Employ-Deploy. Bombers can launch from the U.S., strike targets enroute, and land at an FOL for continued operations. The advantages of CONUS-Employ-Deploy are rapid deployment and higher sortie rates. Aircraft are quickly regenerated after landing at the FOL for subsequent strikes. In Operation DESERT STORM, B-52s were launched from Wurtsmith AFB, Michigan to strike targets in Iraq, then landed in Saudi Arabia. The B-52s that recovered (deployed) in Saudi Arabia were available to fly within six hours of landing.

CONUS-Deploy-Employ. Launching from the U.S., bombers fly directly to the FOL for rapid generation and commencement of operations. This option provides warfighting CINCs with bomber forward presence - immediately available for rapid in-theater response. Combat-loaded bombers are a strong visible deterrent to potential adversaries. Weapons may be loaded prior to CONUS departure, or after arrival in the AOR. Bomber FOL deployment has been used in every recent conflict including B-1s and B-52s stationed at RAF Fairford for Operation ALLIED FORCE and Diego Garcia for Operation ENDURING FREEDOM.

Employment Environments

Bombers are usually employed for maximum impact in parallel, asymmetric operations with other air, sea, and ground forces. While each bomber is capable of independent operations, simultaneous attacks with other U.S. or allied military assets provides a synergistic increase in overall effects. Bombers provide flexibility in terms of varied ordnance and multiple target engagements. A single bomber can attack a myriad of separate targets on a single sortie as demonstrated by the B-2 in Operation ALLIED FORCE. Bombers can strike pre-planned targets or loiter in wait for mobile or time-critical targets as accomplished by B-1s and B-52s in Operation ALLIED FORCE. Bombers achieve combat objectives by employing in two basic environments - Standoff and Direct Attack. With J-series weapons (JDAM, JSOW, and JASSM), each bomber has the ability to employ in both environments throughout the AOR.

Standoff. Standoff may be the initial conflict environment due to the enemy's anti-access / area-denial capabilities, defenses, or political situation. To mitigate threats, roll back enemy defenses, and attack high-value targets, bombers employ standoff tactics and weapons. Standoff allows bombers to remain outside the effective range of enemy defenses, thus increasing their survivability. However, under this operational concept, penetration of enemy airspace may still be necessary. Thus, it is crucial for bombers to retain significant self-defense and SA capability including datalink, enemy threat status, and mission / target update capability. As a general guideline, longer-range threats (e.g., Airborne Interceptors, SA-5s, SA-10s, etc.) require longer range

standoff (e.g., CALCM, JASSM). However, force packaging and effective SEAD can allow shorter range standoff and even direct attack. Table 5.1 shows unclassified standoff ranges and typical defenses (roles) the respective weapons would likely be used against.

Standoff	Role	Weapon	Range (NM)
Long-Range	Theater Defense	AGM-86C (CALCM)	600+
Medium-Range	Area Defense	AGM-158 (JASSM)	200
Short-Range	Point Defense	AGM-154 (JSOW)	40
Short-Range	Point Defense	Small Diameter Bomb	Classified

Table 5.1. Standoff Ranges

Direct-Attack. In direct-attack, bombers strike targets inside enemy airspace using a combination of tactics, weapons and strike package integration. Due to the probability of encountering enemy air defenses, strike assets are usually packaged to increase survivability. Direct-attack strikes fixed, mobile, and emerging targets using off-board and on-board information.

SECTION VI - BOMBER LONGEVITY / REPLACEMENT TIMELINE

Bomber Service Life

Useful service life is based on the point where it is more economical to replace the aircraft than it is to continue structural modifications and repairs. Based on current projections, all three bombers should be structurally sound for the next four or five decades. Figures 6.1, 6.2, and 6.3 show the limiting service life factors and associated fight hours for each of the three bombers.

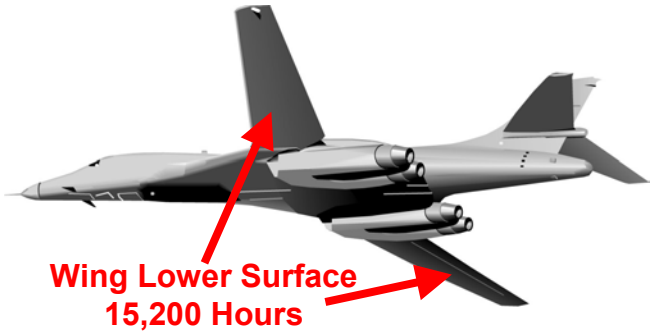

Figure 6.1. B-1 Service Life

The last bomber service life analysis was accomplished in FY98-FY99. This study indicated a Mission Area Assessment was required in 2013 to support a bomber replacement IOC date of 2037. However, changes in planned force structure and deletion of most B-52 low-level flying may have invalidated previous service life conclusions and require new analysis. The Air Force is beginning the Long-Range Strike Aircraft X (LRSA-X) study to examine bomber replacement timelines. Study goal is to start an acquisition program in the 2012 to 2015 timeframe.

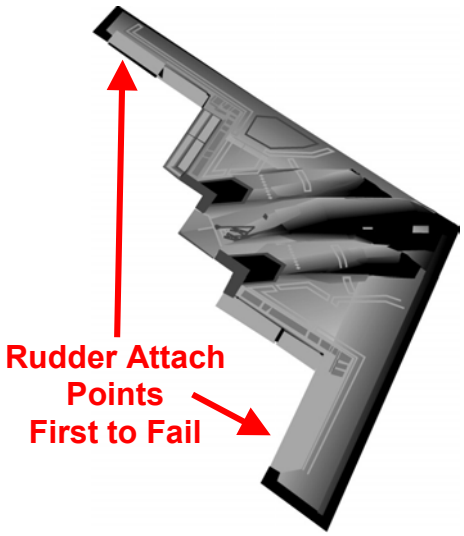

Figure 6.2. B-2 Service Life

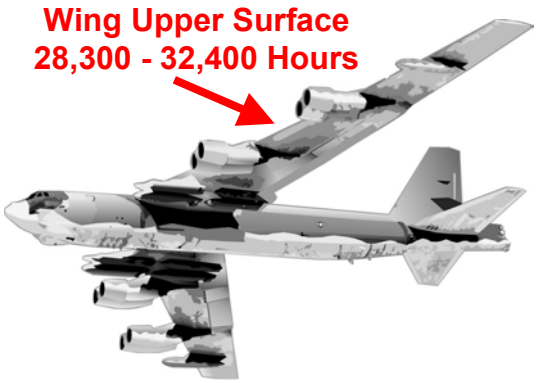

Figure 6.3. B-52 Service Life

Follow-On Long-Range Strike Technology

It is likely that the next generation of long-range strike platforms and weapons will rely on revolutionary technology. The Air Force is actively engaged in

analysis of the path to retain the best attributes of our current platforms (payload, range, and flexibility) while achieving stealth in all dimensions and improving our responsiveness and effectiveness against the full spectrum of potential targets. These efforts will be closely connected to our concept of operations (CONOPs) for the Global Strike Task Force and other CONOPs under development.

Note: previously completed studies in this area include the Future Strike Aircraft (FSA) Studies I and II, Next Generation Bomber Study (NGBS), Long Range Strike Aircraft (LRSA) Study, and Future Bomber I and II Studies. Future efforts in this area will expand the scope of the effort to examine atmospheric, sub-orbital, and orbital solutions a well as supporting weapons advances.

Pressures on the Replacement Timeline

Changes in employment concepts, driven by technological advances in munitions and threats, or improvements in industry's ability to perform cost effective major structural extensions could extend today's bomber force well beyond current projections. This may shift the acquisition timeline for a replacement capability further into the future. Conversely, several factors could require acceleration of the bomber replacement timetable. Some of the most likely factors follow:

Future Threats. Significant developments in counter-stealth technologies, directed energy weapons or proliferation of and advances in surface-to-air missiles and fifth generation fighters could force radical changes in the use of our current forces and have the potential to render much of it obsolete.

Conflict. Any conflict occurring prior to the retirement of the current bomber aircraft could result in a force structure reduction due to combat attrition.

Unforeseen Increases in Sustainment Costs. These can occur from a variety of areas, including parts obsolescence or diminishing manufacturing sources for parts and systems unique to the platforms.

SECTION VII - CONCLUSION

Long-range bombers are integral components of the Air Force's Global Engagement vision. They encompass combat capabilities that impact the full spectrum of conflict. When necessary, long-range bombers can deter aggression / escalation and rapidly project lethal, precise, and massed firepower anywhere on the globe. Timely integration, concentration, employment, and sustainment of long-range air power are important ingredients of U.S. military doctrine and strategy. The Air Force long-range plan for bombers will guide bomber fleet modernization as they remain a key component of our AEFs and a viable tool for the Coalition / Joint Force Component Commander.

It is possible the current bomber fleet will continue to provide these capabilities for the next 35 years or more. In order to maintain bombers as relevant weapon systems, we must sustain the current force by improving supportability, upgrading systems for survivability and connectivity, and improving deployability.

Finally, the Air Force must plan to replace the large payload, long range, and rapid response characteristics inherent in the current bomber force. Ongoing analyses will define technologies and investment strategies for the next generation long-range weapon system. Whatever our replacement strike capability will be, it must preserve current bomber attributes and enable us to dominate our opponents.

As stated in the beginning, this document is not meant to be all encompassing or restrictive in nature. Changes in the threat, advances in weapon technology, unforeseen increases in aircraft attrition, or any number of other variables are cause for modification, addition, or complete re-write. As our new National Military Strategy (NMS), Defense Planning Guidance (DPG), and Operational Plans (OPLANs) are published, this White Paper will likely be further modified.



BOMBER CAPABILITIES / MODERNIZATION

B-1 Capabilities	B-1 Planned Modernization
Speed: 1.2 Mach Range: Intercontinental (unlimited with air refueling) Payload: 55,000 pounds All weather, low-medium altitude, TFR, 3G airframe Offensive System: 3m SAR, INS / GPS, GMTI / GMTT radar modes, 1760 databus Defensive System: ALQ-161 RWR / active RF jamming, ALE-50 towed decoy, chaff, flares Weapons: three internal bays 12 x AGM-154 JSOW (FY04) 24 x AGM-158 JASSM (FY04) 30 x CBU-87, 30 x CBU-89, 30 x CBU-97 24 x GBU-31 JDAM (Mk-84 and BLU-109) 84 x Mk-82 GP / 84 x Mk-62 Quickstrike 24 x Mk-84 / 8 x Mk-65 Quickstrike 96-288 x Small Diameter Bomb (FY08) 30 x WCMD (CBU-103, CBU-104, CBU-105) (FY03)	Block E: advanced avionics, WCMD, JSOW, JASSM Block F: Defensive System Upgrade Program (DSUP). replaces ALQ-161 with IDECM, ALQ-214 technique generator, ALR-56M RWR, ALE-55 towed decoy Interim Datalink: JTIDS Class II Link-16 for increased SA Integrated Datalink: MIDS LVT Link-16, front and aft displays, full integration with aircraft systems Digital Engine Control: replaces analog controllers Intermediate Automatic Test Equipment: replaces unsupportable back-shop test equipment Airborne Digital Recorder: mission reconstruction / debrief JMPS Transition: PC-based AFMSS upgrade SDB Integration: high-loadout near-precision standoff CITS / EMUX: computer hardware / software upgrade of aircraft diagnostic systems, aids maint troubleshooting CBM Test Sets: replaces bomb module test equipment INS Upgrade: laser-gyro GSS replacement
B-2 Capabilities	**B-2 Planned Modernization**
Speed: High subsonic Range: Intercontinental (unlimited with air refueling) Payload: 40,000 pounds All weather, low-high altitude, TFR Offensive System: 3m SAR, INS / GPS, GMTI / GMTT radar modes, 1760 databus Defensive System: Classified Weapons: two internal bays 16 x AGM-154 JSOW 16 x AGM-158 JASSM (FY03) 34 x CBU-87, 34 x CBU-89, 34 x CBU-97 16 x GBU-31 JDAM (Mk-84 and BLU-109) 80 x 500-pound JDAM (FY04) 8 x GBU-37 GAM / 8 x EGBU-28 (FY04) 80 x Mk-82 GP / 80 x Mk-62 Quickstrike 16 x Mk-84 GP / 36 x M-117 Blast 64-192 x Small Diameter Bomb (FY09) 16 x B-61 / 16 x B-61-1 / 16 x B-83 Nuclear	Link-16 / CID / IFR: integrated Link-16, display upgrades, in-flight replanning capability EGBU-28 Integration: 5000-Lb GPS-aided "bunker buster" replaces interim GBU-37 B-2 Shelter System: facilitates FOL LO maintenance, enhances deployability, increases sortie rates 500-Lb JDAM Integration: higher loadout of GPS bombs EHF SATCOM: provides SIOP and BLOS connectivity UHF SATCOM: replaces current UHF / VHF radios JMPS Transition: PC-based AFMSS upgrade SDB Integration: high-loadout near-precision standoff Radar Upgrade: relocates radar freq to avoid interference Digital Engine Control: replaces analog controllers Alternate High Frequency Material: permanent LO coating to replace high-maintenance tape and access panels LO Maintenance Upgrades: three programs designed to reduce maintenance man-hours and increase MC rates GATM: complies with ICAO frequency requirements
B-52 Capabilities	**B-52 Planned Modernization**
Speed: 0.84 Mach Range: Intercontinental (unlimited with air refueling) Payload: 50,000 pounds All weather, low-high altitude, 2G airframe Offensive System: Analog Ground Map Radar, INS / GPS, 1760 databus (external pylons only) Defensive System: ALQ-155 / ALQ-172 RWR, active RF jamming, chaff, flares Weapons: one internal bay, two external pylons 8 x AGM-84D Harpoon / 3 x AGM-142 Have Nap 20 x AGM-86C CALCM / AGM-86B ALCM (Nuclear) 12 x AGM-154 JSOW (FY02) 12 x AGM-158 JASSM (FY03) 24 x CBU-87, -89 / 16 x CBU-103, -104 WCMD 10 x GBU-10 LGB / 10 x GBU-12 LGB 12 x GBU-31 JDAM (Mk-84 and BLU-109) 45 x Mk-82 GP / 45 x Mk-62 Quickstrike 18 x Mk-84 GP / 45 x M-117 Blast 18 x Mk-63, -65 Quickstrike / 20 x M-56 Moored Mine 48-144 x Small Diameter Bomb (FY12) 8 x B-61 / 8 x B-83 / 12 x AGM-129A ACM Nuclear	Avionics Midlife Improvement: upgrades INS, ACU, and data transfer system - replaces obsolete equipment Situational Awareness Defensive Improvement: replaces unsupportable ALR-20 panoramic receiver Electronic Countermeasures Improvement: R&M initiative to replace high-failure components in ALQ-172 EHF SATCOM: provides SIOP and BLOS connectivity GATM: complies with ICAO frequency requirements Tactical Datalink: LOS Link-16 to increase SA, survivability, flexibility, and mission effectiveness CALCM In-Flight BLOS Rapid Retasking: dynamic in-flight CALCM retargeting, enhances standoff flexibility 1760 Databus in the Bomb Bay: allows carriage of smart weapons internally (current - external pylons only) JMPS Transition: PC-based AFMSS upgrade Crash Survivable Flight Data Recorder: data recorder to aid mishap reconstruction and investigations Electro-Optical Viewing System: provides FLIR and STV for night and weather operations Link-16: mid-term integrated datalink SDB Integration: high-loadout near-precision standoff